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Division of Mycology and Disease Survey

Volume XXIII Number 17

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BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

Volume XXIII Number 17

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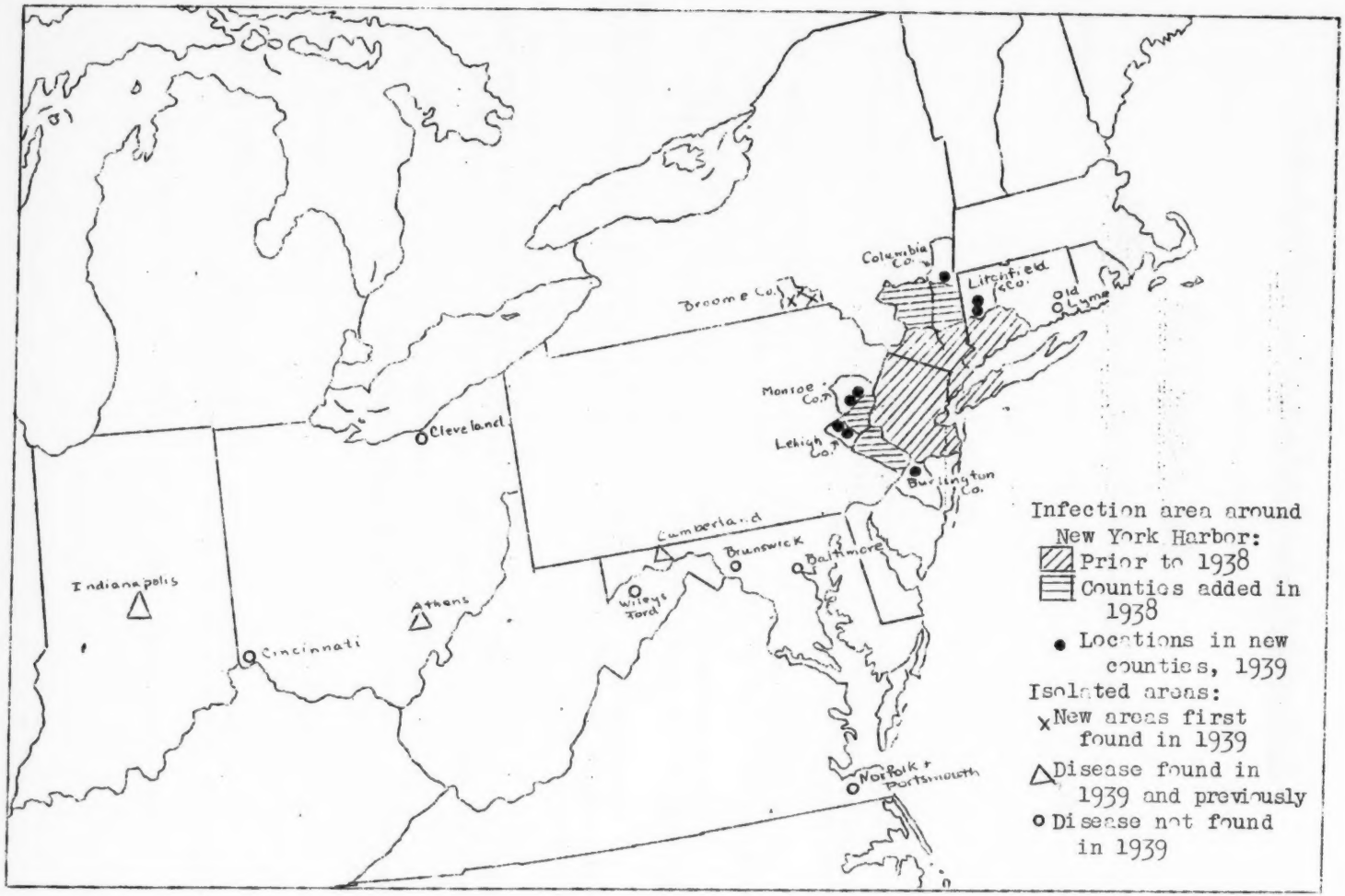


Places where Dutch elm disease has been found in the United States.

PRESENT STATUS OF THE DUTCH ELM DISEASE

(Compiled from weekly reports of the Bureau of Entomology and Plant Quarantine for the period January 1 to September 9, inclusive).

The accompanying map shows the present known distribution of the putch elm disease in this country.

Confirmation of Ceratostomella ulmi in elm samples from new locations has extended the main infected area around New York harbor into 5 additional counties, including:

In Connecticut, Litchfield County; first in Woodbury Township 12 miles from the nearest confirmed tree in Newton, Fairfield County; later in Litchfield (reports of August 5 and September 2).

In New York, Columbia County, in Ancram Township (August 19).

In Pennsylvania, Monroe County, in Smithfield and Stroud Townships; and Lehigh County, in Upper Saucon and Salisbury Townships (August 26, September 2).

In New Jersey, Burlington County, in Chesterfield Township (September 2).

A second additional county in New York constitutes a new outlying area. The disease was found for the first time in Broome County, in a tree near Harpersville in Fenton Township. Later 3 diseased trees were found in Windsor and another at Kirkwood (July 29, August 19, September 9).

A confirmed tree in Cumberland is the second for that location, where the only other infection recorded was in 1936 (September 2). Diseased trees continue to be found in the Indianapolis region and in the vicinity of Athens, Ohio. Recurrence has not been noted in the other isolated areas this year.

The number of confirmed trees from the beginning of the year to September 9 is as follows:

Connecticut	348	Indianapolis area	15
New Jersey	8,438	Athens, Ohio	5
New York	1,242	Cumberland, Maryland	1
Pennsylvania	197		

Total 10,246

By a modification of the Dutch elm disease quarantine regulations effective September 11, the Secretary of Agriculture designates as regulated areas "the counties, townships, towns, cities and boroughs listed below, including all cities, towns, boroughs, or other political subdivisions within their limits:

"Connecticut.--All of Fairfield County except the towns of Brookfield, New Fairfield, and Sherman; town of Southbury, in New Haven County; and the town of Woodbury, in Litchfield County.

"New Jersey.--Counties of Bergen, Essex, Hudson, Hunterdon, Mercer, Morris, Passaic, Somerset, and Union; all of Middlesex County except the townships of Cranbury and Monroe, and the boroughs of Helmetta, Jamesburg, and Spotswood; all of Monmouth County except the townships of Freehold, Millstone, Neptune, and Wall, the city of Long Branch, and the boroughs of Avon-by-the-Sea, Belmar, Bradley Beach, Brielle, Freehold, Manasquan, Neptune City, Sea Girt, South Belmar, Spring Lake, and Spring Lake Heights; all of Sussex County except the township of Walpack; and all of Warren County except the township of Pahaquarry.

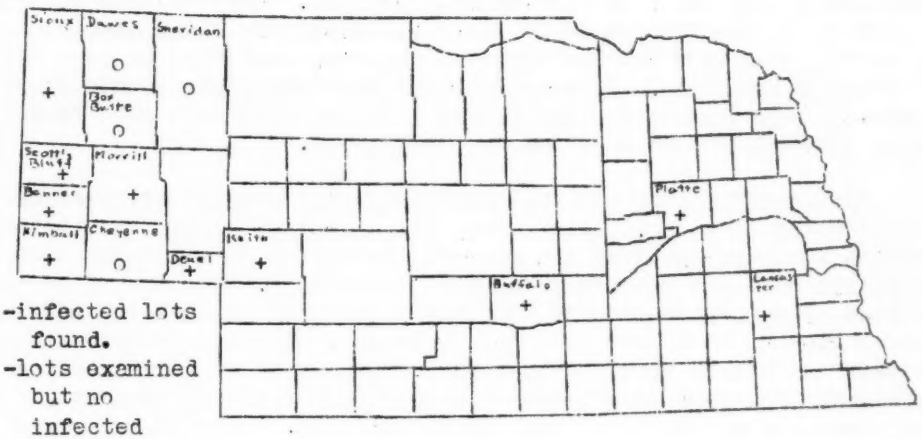
"New York.--Counties of Bronx, Dutchess, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, and Westchester; town of Ancram, in Columbia County; all of Orange County except the towns of Crawford, Deerpark, and Wallkill, and the cities of Middletown and Port Jervis; town of Huntington, in Suffolk County; and the towns of Esopus, Lloyd, Marlborough, New Paltz, Plattekill, and Saugerties, and the city of Kingston, in Ulster County."

A SURVEY OF BACTERIAL WILT AND RING ROT OF POTATOES IN NEBRASKA IN THE SPRING OF 1939

R. W. Goss and J. H. Jensen

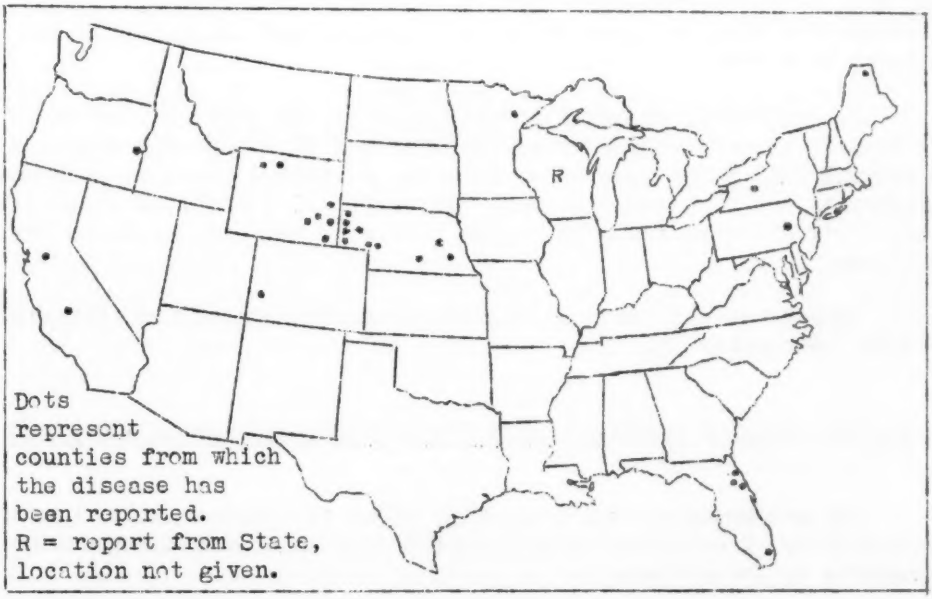
Bacterial wilt and ring rot of potatoes was first identified in Nebraska in November, 1938. Isolation of the organism [Bacterium sepedonicum], inoculation and reproduction of the disease were completed by February, 1939. The first public report of the presence of the disease in the State was made March 17, 1939, in a newspaper release. Soon after the first announcement was made 2 separate surveys were undertaken, the results of which are presented in this report, and are shown on the accompanying map.

The first survey was concerned only with non-certified or table stock lots of potatoes in storage in western Nebraska. Preliminary inspection of potato samples was made by a member of the Nebraska State



\+ -infected lots found.
o -lots examined but no infected tubers found.

Distribution by counties of potato lots infected with ring rot in Nebraska, spring, 1939.



Dots represent counties from which the disease has been reported.
R = report from State, location not given.

Distribution of bacterial ring rot of potato in the United States, by States and counties, as reported to the Plant Disease Survey.

Department of Agriculture and Inspection working in cooperation with the county agents of the University Agricultural Extension Service. Most of the lots inspected were samples brought in by growers, or represented an inspection of the culls or sort-outs in cellars. Questionable material was sent in to the Department of Plant Pathology for final examination. This survey covered 8 western Nebraska counties and represented a total of 215 individual lots. Using either the bacterial-smear-stain technique or agar-plate cultures, or both methods, 21 of these lots were found to contain tubers infected with bacterial ring-rot.

The second survey was concerned only with samples of Nebraska Certified seed potatoes. This survey was conducted by members of the Certification Department of the Nebraska Certified Potato Growers in cooperation with the Department of Plant Pathology. The method of survey consisted of an examination of 300 2-hill units of each of 254 lots of potatoes growing in a test plot near Fairhope, Alabama. Inspection was made when the plants were nearly mature. Smears on glass slides were made of the lower stems of many plants showing unusual wilting symptoms and in other cases the entire plant and tubers were dug. Glass slide smears and plant material of all suspected lots were sent to this laboratory for examination. Out of smears or plant material representing 25 suspected lots 6 were found to contain plants infected with bacterial wilt and ring rot.

As a result of newspaper publicity given the identification of ring rot in Nebraska, a number of specimens including samples of imported seed for early planting were sent in by individual growers. Tubers infected with ring rot were found in 5 samples and in each case the infected lots were of out-of-State origin.

To summarize, in the 2 surveys made in the early spring of 1939 215 lots of stored non-certified stock showed 21 to contain infected tubers and out of 254 samples of Nebraska Certified potatoes 6 showed the presence of the ring-rot organism. In addition, 5 infected lots of out-of-State origin were found which had been sold as seed for early spring planting.

(Department of Plant Pathology, Nebraska Agricultural Experiment Station. September 8).

DISTRIBUTION OF BACTERIAL RING ROT OF POTATO IN THE UNITED STATES

The accompanying map (page 289) gives the distribution, by States and counties, of bacterial ring rot of potato in this country, as shown by reports to the Survey.

POTATO LATE BLIGHT AND OTHER DISEASES IN NEW YORK

(From Weekly News Letter, September 5)

Late Blight in Erie County: Late blight [Phytophthora infestans] is becoming very serious in the southern half of Erie County. The unsprayed fields in the vicinity of Sardinia that were beginning to be affected last Saturday are now dead. The field that I reported last week as showing 25 percent infection is dead. Particularly in the sections around Sardinia, all unsprayed fields are rapidly blighting. Fields that have been regularly sprayed, even in this vicinity, are standing up satisfactorily. If cool evenings and heavy dews continue as during the past week, all unsprayed fields throughout the county will be completely blighted. It seems to me that the blight this year is spreading even more rapidly than last year. (C. F. Crowe).

Late Blight and Other Diseases in Monroe County: Late blight is spreading rapidly and many fields not sprayed or dusted are partially or completely dead. This is several weeks earlier than last year's blight and the yield will be much more severely cut than in 1938. There is entirely too much blight for comfort in fields that have been dusted regularly and perhaps even in well sprayed fields. Potatoes are ripening up some due to dry weather, particularly where leaf hoppers have not been controlled or where the supply of organic material is low. Yellow dwarf [virus] is rather light and Z-disease [Fusarium eumartii] seems less severe than during 1937 and 1938. (R. G. Palmer).

A SURVEY OF THE OCCURRENCE OF THE BULB OR STEM NEMATODE ON ONIONS IN THE STATE OF NEW YORK

A. G. Newhall, R. L. Clement, I. D. Smith, and B. G. Chitwood

At the request of Dr. A. B. Buchholz, Director of the New York State Bureau of Plant Industry, a cooperative survey was made of the onion-producing areas in the vicinities of Canastota (Madison County) South West Oswego (Oswego County), Savannah (Wayne and Oswego Counties) and Florida (Orange County).

An area of onions infested with Ditylenchus dipsaci (the bulb or stem nematode) was known in the vicinity of Canastota as far back as 1931. After steam sterilization of the infested field no more infestations were reported until 1938. At that time Mr. Hayes, the County Agent, called the senior author's attention to several infested spots in 3 fields near Canastota. These were treated by members of the State Department of

Agriculture, cooperating with the Madison County Farm Bureau, some with sulphur and one with chloropicrin. Newhall reported on the appearance of these areas in mid-July (PDR 23: 230. 1939). Examination after harvest in August 1939 showed that sulphur at the rate of one ton per acre was unsatisfactory as an eradicator. No infested bulbs were found where higher sulphur treatments (1-1/2 tons or more per acre) were applied but there was definite reduction in crop due to sulphur, particularly in one field where the pH of the soil was already rather low (4.72). No actual identification of Ditylenchus dipsaci is recorded from the exact spot treated with chloropicrin in 1938, but, according to Mr. Hayes, the general area had the same appearance as others known to be infested and certain onions submitted for examination and found to contain D. dipsaci came from this general area. The treatment was at the rate of 348 pounds of chloropicrin per acre applied by doses of 4 cc. spaced in rows and holes 15 inches apart to a depth of 8 inches.1/

In 1939 the onions in the chloropicrin treated spot were as good or better than those in other parts of the field and no infested bulbs were found.

A survey of approximately 1000 acres of onions in the vicinity of Canastota failed to reveal other infested spots. Less extensive surveys in the vicinity of Lansing (5-1/4 acres), South West Oswego (125 acres), Fairhaven (7 acres), Victory (3 acres), and Savannah (125 acres) also failed to reveal infestation with Ditylenchus dipsaci.

However, a survey of approximately 150 acres out of a total acreage of about 6700 in onions in Orange County revealed 2 infested fields between Big Island and Florida. The actual area found to be infested amounted to about 1/3 of an acre.

Since an effort was made to examine all fields known to exhibit some cultural difficulty, the survey might be considered as representative of an area considerably larger than the acreage indicated.

It seems, therefore, that Ditylenchus dipsaci is not of general distribution in the onion-producing areas of New York. All of the infestations located (both in 1938 and 1939) were of rather long duration, having been known to the growers for from 3 to 6 years. Such spots are generally attributed to lightning striking the muck. Only when they appear to grow instead of diminish in size do the farmers take particular

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1/ As recalled by one of us (A.G.N.) it rained just after chloropicrin was applied, thus giving a water seal that might have been very important. Temperature and moisture conditions were good for the best action of this chemical.

notice. It appears that all the infestations began at about the same time and have been gradually increasing since.

(New York State College of Agriculture, New York State Department of Agriculture and Markets, and U. S. Bureau of Plant Industry, in cooperation with the Farm Bureaus of Madison, Oswego, and Orange Counties).

CHOANEPHORA ON PEAS

J. L. Weimer and W. A. Jenkins

During the latter part of a rainy period at Experiment, Georgia, which began August 13, 1939, and lasted for several days, a few young leaflets of hybrid peas (Pisum sativum x P. arvense) growing under a cloth shelter died. No explanation for their death can be suggested unless it be that, due to the excessively high humidity accompanied by high temperature, certain tissues in or near the terminal bud became so turgid that the cells were killed. A few days after the leaflets died a fungus was observed sporulating on 2 of the plants. The fungus first attacked the dead cells and then spread into the adjacent healthy tissue where it produced a water-soaked appearance and finally killed tendrils, petioles, leaves, and some of the outer cells of the main stem. The extent of the damage was slight and was limited to 2 plants resulting from a single cross. These plants were growing in pots at opposite sides of the enclosure and were about 8 feet apart. Surrounding these plants on 3 sides were other hybrid peas none of which were attacked, although they also had some dead leaves.

The fungus has tentatively been referred to Choanephora conjuncta Couch although in culture certain differences from this species are apparent.

Speculation as to the probable source of the pea fungus led the writers to search for species of Choanephora on other hosts nearby. What appeared to be the same species was found on the faded fallen blossoms of Hibiscus syriaca, cotton, okra, petunia, and morning glory. This fungus was determined to be C. conjuncta. Choanephora cucurbitarum (Berk. and Rav.) Thaxter was found on okra and cowpea.

There were certain differences between the fungi on Hibiscus, cotton, petunia, and morning glory, and that on peas, when all were cultured and compared, just as there was between the pea fungus and the written description of C. conjuncta. Whether these differences are to be considered as variations within the species or whether the pea fungus is worthy of specific rank remains to be determined.

(Division of Forage Crops and Diseases and the Georgia Agricultural Experiment Station).

EPIDEMIC OF BITTER ROT OF APPLE IN SOUTHERN ILLINOIS IN 1939

G. H. Boewe

An epidemic of apple bitter rot, Glomerella cingulata (Stonem.) S. and v.S., was found beginning on August 17 in orchards in the north half of the southern third of Illinois, although the first case was observed on August 3 in Massac County on the Red Delicious variety. After the middle of August the disease was found in all orchards where it might be expected.

Since bitter rot has not been a serious problem in apple production in recent years, not many growers are using Bordeaux sprays late in the season. This is the worst outbreak of the disease since 1926 and 1927, when the greatest damage occurred in western Illinois. The writer has not examined any orchards this fall in the counties bordering the Mississippi River or north of a line extending from Clark to Jersey counties.

The following table will show the prevalence and intensity of the disease and varieties affected.

County	Variety	Number of trees in orchard	Percentage of trees with infection	Average percentage of fruit infected in orchard
Bond	Ben Davis	1000	35.0	1.155
	Grimes Golden	50	0.0	0.0
	Golden Delicious	250	8.0	0.016
Clark	Golden Delicious	25	4.[illegible]	T
	Jonathan	125	20.0	0.03
Clay	Grimes Golden	200	0.0	0.0
	Jonathan	400	0.0	0.0
Edwards	Golden Delicious	70	0.0	0.0
Franklin	Golden Delicious	250	20.0	0.02
Jefferson	Jonathan	450	18.0	0.9
	Golden Delicious	25	20.0	0.4
	Golden Delicious	150	20.0	0.8
	Grimes Golden	350	30.0	0.375
	Jonathan	500	33.33	T
	Grimes Golden	15	20.0	1.04
Jersey	Gano	1000	0.0	0.0
	Red Delicious	500	0.0	0.0
	Willow Twig	300	0.0	0.0
Marion	Grimes Golden	30	8.0	0.152
Massac	Red Delicious	37	10.0	0.002
Richland	Jonathan	250	10.0	0.170

(Section of Applied Botany and Plant Pathology, Illinois Natural History Survey, Urbana).

REDUCTION IN WHEAT YIELD IN ILLINOIS IN 1938 DUE TO THE ORANGE LEAF RUST

L. R. Tehon

A reduction of 15 percent in Illinois' 1938 wheat yield is estimated to have resulted from attack by the orange leaf rust (Puccinia rubigo-vera var. tritici (Erikss. & Henn.) Carl).

This loss estimate, the greatest ever attributed to leaf rust in Illinois, is made in spite of the fact that the Illinois wheat yield was 1.4 bushels per acre greater in 1938 than the average per-acre yield for the previous 10 years. Reasons for placing the estimate at the figure given above are:

1. Both the prevalence of the rust and the intensity of the rust attack were unusually high.

2. Weather conditions during the first half of 1938 were unusually conducive to good growth and, without rust attack, should have resulted in a wheat yield much in excess of that actually reported.

3. Leaf rust was the chief cause, among diseases, of reduced yield.

4. Leaf rust attack began earlier in 1938 than in 1937.

5. Leaf rust developed rapidly, and in many fields the intensity of attack was already high by the time the grain had reached the pre-milk stage.

6. Past estimates of leaf rust losses have also been considered.

Our 1938 data to show prevalence and intensity of the orange leaf rust were obtained after June 1. In approximately 50 percent of the fields grain was past the early dough stage at the time the examinations were made; in the balance grain was between the pre-milk and early dough stages. The data, when summarized, showed that 100 percent of the culms bore diseased leaves and that 17.2 percent of the leaf area was occupied by rust pustules, as an average for the whole State. This leaf rust intensity has been exceeded only twice in 10 previous years.

The 1938 season favored exceptional development of the wheat crop. Winter wheat suffered very little damage from alternate freezing and thawing. In late winter and early spring temperatures were higher than average and rainfall was 2.66 inches more than normal. In late spring, mild, wet weather was conducive to rank growth. Both temperature and

rainfall during the balance of the growing season favored continued crop development and a large yield. Weather Bureau Reports indicated wheat to be in average to excellent condition until the last of June, when they reported wheat in generally average condition despite fly and rust damage. The actual yield for the State averaged 18.5 bushels per acre,--1.4 bushels above the average per-acre yield for the period 1928-1937.

Leaf rust, in 1938, caused a greater reduction in wheat yield than all other diseases. Stem rust, although prevalent, as a State average, on 54.5 percent of the wheat stems, was estimated to have reduced yield by 2 percent. Other diseases were of minor importance, their combined effect being to reduce yield by probably less than 6 percent.

An early date of initial rust infection, if followed by weather conducive to rust increase, is a factor in determining rust damage. Phenologically, the 1938 season was about 2 weeks earlier than normal, and leaf rust infection occurred correspondingly earlier in 1938 than in 1937. In 1938, first leaf rust pustules were observed on April 26, in a field in Gallatin County; 5 percent of the stems had one leaf each infected. Wheat plants had jointed, but heads had not emerged from the boots. In 1937, first leaf rust pustules were observed on May 21 in a field in Washington County; 2 percent of the stems had one leaf each infected. A few plants were headed out on that date.

Following an early occurrence of initial infections, rapid development of the rust epidemic is likely to severely reduce wheat yield. The first field examined for epidemic measurement was in Randolph County. In this field, on June 2, with grain then in the early dough stage, leaf rust was occupying 29.4 percent of the leaf area. In two fields with grain in the early milk stage, leaf rust pustules were occupying 21.2 percent and 21.6 percent of the leaf area. In some fields examined when grain was in the early dough stage, all leaves were dead, although stems were still green.

A comparison of the annual prevalence and intensity indexes of leaf rust with the annual estimates of reduction in wheat yields due to leaf rust in Illinois during the past 10 years shows that high rust prevalences and high rust intensities have usually been considered to have caused large reductions in yield. But in none of the 10 previous years have weather conditions been so clearly favorable both to high wheat yield and heavy rust development as in 1938. In the absence of destruction by other diseases and pests, the failure of wheat to give an outstandingly large yield in 1938 can reasonably be considered due in large measure to the heavy leaf rust attack.

(Illinois State Natural History Survey).

AUGUST WEATHER

(From U. S. Dept. Agr. Weather Bureau, Weekly Weather and Crop Bulletin for week ending September 5).

The average temperature for August 1939 was above normal in almost the entire country. A few local areas, principally in the Southeast and the middle Mississippi and lower Missouri Valleys, had slightly below-normal temperature, but otherwise the monthly means were approximately normal to considerably above normal, except very locally. However, in most sections the plus departures were moderate, usually 1° or 2°, except from the Lake region eastward and over the Northwest where the month was from 3° to 6° warmer than normal.

Figure 1 shows that August rainfall was very unevely distributed geographically, with wide variations in contiguous sections. In general, the monthly totals were above normal in the Atlantic area, the upper Mississippi Valley, and upper Lake region; also locally in the Great Plains, the Rio Grande Valley, and the Pacific Northwest. Otherwise the month was drier than normal, decidedly so in the Rocky Mountain and Great Basin areas. An illustration of the spottedness of the rainfall is afforded by the records for St. Louis, Missouri and Cairo, Illinois, having more than three times the normal and less than half the normal, respectively; also Meridian, Mississippi and Montgomery, Alabama, the former having less than half the normal and the latter nearly four times the normal.

THE SUMMER OF 1939

The summer (June-August) was uniformly warmer than normal, following a trend that has been in evidence for a good many years. In a few widely scattered localities the mean temperatures for the season were slightly below normal, but in general they were from 1° to nearly 4° above normal. The outstanding temperature features for the summer were the persistence of warm weather and the uniformity of the plus departures from normal in nearly all areas.

Figure 2 shows that rainfall was markedly deficient over much of the western half of the country with large areas in the central Rocky Mountains and the northern Great Basin having from less than one-fourth to only about half the normal rainfall. Also a considerable northeastern area, from the upper Ohio Valley northeastward, and another in the South-Central States had deficient moisture. In most other localities east of the Mississippi River the rainfall was above normal.

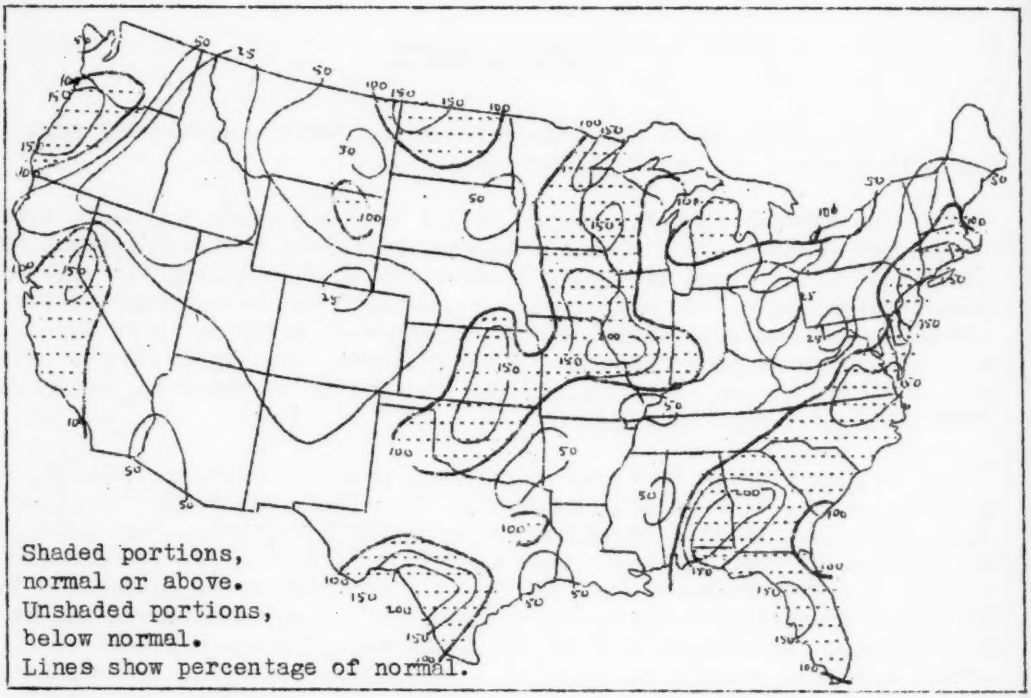

Figure 1. Percentage of normal precipitation for August 1939.

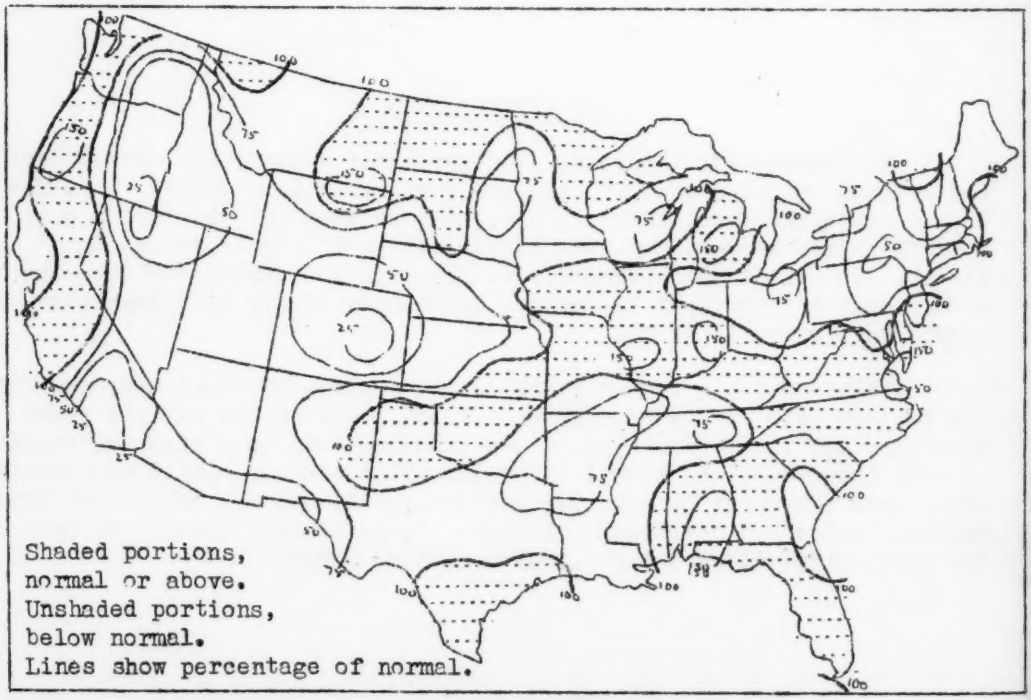

Figure 2. Percentage of normal precipitation for summer (June-August) 1939.